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THE WORK OF THE TRUCKEE-CARSON RECLAMATION PROJECT EXPERIMENT FARM IN 1915.

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INTRODUCTION.

The work of the Truckee-Carson Experiment Farm is directed toward the solution of local problems of crop production. It includes experiments in the reclamation of alkali lands, in the testing of varieties of crop plants, and, by cooperative work with farmers, in bringing about the use of better crops and better methods of farming. The work of the farm is chiefly investigational. The problems of successful crop production in this region are such that experience gained in other sections is seldom directly applicable. Even within the limits of the irrigation project there are several different types of soil, so that it has been found advisable to conduct some of the experiments cooperatively on farms where the different types of soil occur. This cooperative work has been continued for several years and during 1915 was extended somewhat.

In addition to these cooperative experiments, which have been concerned with the problems of crop production, some attention has been given to the problems of crop utilization. More than half the cropped acreage of the project is used for the production of alfalfa, which usually gives better returns if used on the farm where it is produced than when shipped to distant markets for sale.

The dairy industry has seemed a promising one for this section, and an endeavor has been made to promote it. In September, 1914, a man was assigned to this work from the Office of Demonstrations on Reclamation Projects, and the problems of the dairy industry

[1] The Truckee-Carson Experiment Farm is located on the United States Reclamation Project of the same name about 1 mile south of the town of Fallon, Nev. The tract consists of 160 acres withheld from entry by the Department of the Interior and set aside for use as an experiment farm.

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have been given continuous attention since that time. The best results in dairying require the use of other feeds to supplement alfalfa, and some of the work of the experiment farm, as well as some of the cooperative experiments with farmers, has been to determine which varieties of such supplemental feeds as corn, barley, and mangels were the best to use.

WEATHER CONDITIONS.[1]

The weather for the year closely approximated normal conditions, as determined by 10 years' record, except that on April 29 and 30 there was a rain, snow, and wind storm, accompanied by freezing weather, which resulted in much damage to the alfalfa and fruit crops. It is somewhat unusual to have a freeze accompanied by a heavy wind. Most of the spring frosts which injure crops occur on still nights.

In the autumn, the first killing frost occurred six days earlier than normal. The frost-free period for the year was 117 days, whereas the average time between the last spring frost and the first in autumn, as determined from the records of the past 10 years, is 124 days. (Table I.)

TABLE I.—*Summary of climatological observations at the Truckee-Carson Experiment Farm, 1906 to 1915, inclusive.*

PRECIPITATION (INCHES).

Year, etc.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total.
Average for 10 years,[2] 1906 to 1915	0.80	0.40	0.44	0.63	0.49	0.40	0.21	0.22	0.29	0.30	0.27	0.55	5.00
For the year 1915...	.11	1.13	.57	2.14	.21	0	.18	.58	.41	0	.09	.79	6.21

EVAPORATION (INCHES).

Average for 8 years,[3] 1908 to 1915.....	1.38	1.94	4.05	6.01	8.20	9.81	10.67	9.83	6.53	3.95	2.16	0.84	65.37
For the year 1915...	.93	2.12	4.47	5.51	7.05	11.34	10.84	10.09	6.52	4.48	2.53	1.15	67.03

DAILY WIND VELOCITY (MILES PER HOUR).

Average for 7 years,[4] 1909 to 1915.....	3.72	3.82	4.57	5.52	5.04	4.66	3.60	3.26	3.36	2.97	3.06	2.97	3.88
For the year 1915...	3.6	5.3	4.2	5.4	5.5	5.4	4.0	2.8	3.5	2.6	3.6	3.3	4.10

ASPECT OF THE SKY (DAYS).

Prior to 1915:													
Clear.....	11.5	14.0	18.1	18.5	18.0	22.0	22.0	24.9	22.4	23.2	17.9	13.0	225.5
Partly cloudy..	10.3	8.2	8.3	6.8	9.4	4.3	6.0	3.5	4.3	3.1	5.9	7.5	77.6
Cloudy.....	9.2	6.0	4.6	4.7	3.6	3.7	3.0	2.6	3.3	4.7	6.2	10.5	62.1
For the year 1915:													
Clear.....	11	5	20	15	13	30	25	29	26	29	13	10	226
Partly cloudy..	12	10	7	6	10	0	6	2	1	1	9	13	77
Cloudy.....	8	13	4	9	8	0	0	0	3	1	8	8	62

[1] Weather records are kept in cooperation with the United States Weather Bureau, the Biophysical Laboratory of the Bureau of Plant Industry, and the University of Nevada.

[2] January, February, and March, 9 years.

[3] January and February, 6 years; March, 7 years.

[4] January, February, March, and April, 6 years.

TABLE I.—*Summary of climatological observations at the Truckee-Carson Experiment Farm, 1906 to 1915, inclusive*—Continued.

TEMPERATURE (° F.).

Year, etc.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total.
Absolute maximum:													
10 years,[1] 1906 to 1915	70	72	79	89	102	101	103	103	95	88	81	72	.....
For 1915	57	60	74	80	84	94	99	100	89	86	73	62	.....
Absolute minimum:													
10 years,[2] 1906 to 1915	−15	−12	9	13	21	33	38	36	26	15	−1	−3	.....
For 1915	0	13	21	27	29	37	44	46	30	23	9	−1	.....
Mean:													
10 years,[3] 1906 to 1915	32.1	37.2	43.6	51.1	56.5	64.6	73.1	71.7	61.1	50.6	41.3	31.4	.....
For 1915	31.1	39.6	44.3	52.6	54.5	63.6	71.8	73.8	60.8	52.7	41.4	35.4	.....

KILLING FROSTS.

Year.	Last in spring.	First in fall.	Frost-free period.	Year.	Last in spring.	First in fall.	Frost-free period.
			Days.				*Days.*
1906	May 31	Oct. 4	126	1912	May 22	Sept. 25	126
1907	May 14	Sept. 19	128	1913	May 13	Sept. 23	133
1908	May 30	Sept. 25	118	1914	Apr. 24	Sept. 9	138
1909	May 24	Sept. 22	121	1915	May 20	Sept. 14	117
1910	May 16	Oct. 13	120				
1911	May 27	Sept. 18	114	Average	May 19	Sept. 20	124

[1] March and October, 9 years. [2] Three days estimated. [3] One day estimated.

TEMPERATURE SURVEY OF THE PROJECT.

In cooperation with the University of Nevada, a temperature survey of the project was begun early in July, 1915. Thermographs furnished by the university were installed in locations designed to represent the various sections of the project, as follows: United States Indian Reservation, 10 miles east of Fallon; farm of T. V. Conners, 9 miles south of Fallon; farm of W. G. Swingle, 14 miles west of Fallon; farm of W. W. Cogswell, 5 miles east of Fernley; and the United States Indian Reservation near Pyramid Lake.

TABLE II.—*Mean minimum temperatures in various parts of the Truckee-Carson project, showing effect of elevation on minimum temperatures.*

Location.	Cooperator.	Elevation.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Fernley Bench	W. W. Cogswell	4,180	58.5	.....	47.8	38.2	29.3	24.6
Swingle Bench	W. G. Swingle	4,084	54.2	56.0	.....	36.9	27.0	23.2
Pyramid Lake	J. D. Oliver	3,900	53.3	52.4	.....	.....	.....	25.7
Fallon, Nev	United States Experiment Farm	3,970	53.9	52.9	42.3	31.9	24.5	23.1
Island District	T. V. Conners	3,930	54.2	54.3	43.4	30.1	22.6	22.4
Indian School	W. A. Van Voorhis	3,915	53.0	52.0	41.9	31.3	24.7	22.3

It is noticeable from the results so far obtained that those parts of the project having the higher elevation, and consequently better air drainage, have a very noticeable advantage in the matter of

minimum temperatures. The mean minimum temperatures of all stations for each month from July to December, inclusive, is shown in Table II. The instruments having been installed on July 7 and 8, the records for July are for the last 23 days only.

By considering the high land districts to be represented by the Fernley Bench and the Swingle Bench and the lower lands by Fallon, Island District, and the Indian School, and taking the average minimum temperature, we have results as shown in Table III, in which it is seen that the higher lands have a decided advantage in minimum temperatures.

TABLE III.—*Mean minimum temperatures compared on high lands and low lands of the Truckee-Carson project.*

Region.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
High lands	56.4	56.0	47.8	37.6	28.2	23.9
Low lands	53.7	53.1	42.5	31.1	23.9	22.6
Difference in favor of the high lands	2.7	2.9	5.3	6.5	4.3	1.3

Although the higher lands have a higher mean minimum temperature than the low lands, there is practically no difference in the maximum temperature. A comparison of the mean maximum temperature of the high lands and low lands is shown in Table IV.

TABLE IV.—*Mean maximum temperatures compared on high lands and low lands of the Truckee-Carson project.*

Region.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
High lands	89.4	93.8	79.2	74.4	57.0	45.4
Low lands	89.7	93.3	78.9	73.3	57.6	46.8

AGRICULTURAL CONDITIONS.

In 1915 the total area under cultivation was increased by 2½ per cent over the total area cropped in 1914. The acreage devoted to alfalfa and wheat was largely increased, while the areas planted to potatoes and onions have gradually decreased from year to year, apparently due to the uncertain markets for these products.

Although the alfalfa area was increased 12½ per cent, the total production of this crop was less than in 1914. The decrease in yield was caused by the freeze of April 29–30. The value of the alfalfa crop alone is more than 66 per cent of the total value of all crops raised on the Truckee-Carson project.

Table V, prepared from reports made by the United States Reclamation Service, shows the acreage, production, and value of the more important crops and the total number of acres and farm values of all crops raised on the project during the past four years.

TABLE V.—*Acreage, yields, and farm values of crops produced on the Truckee-Carson Reclamation Project in 1915.*

Crop.	Area.	Yields.				Farm values.		
		Unit.	Total.	Per acre.		Per unit of yield.	Total.	Average per acre.
				Average.	Maximum.			
	Acres.							
Alfalfa hay	18,273	Ton	53,496	2.93	7	$8.00	$427,968	$23.36
Barley	1,733	Bushel	49,585	28.61	67	.60	29,750	17.16
Wheat	2,582	...do	54,065	20.94	50	.90	48,660	18.85
Oats	428	...do	14,375	33.58		.56	8,050	18.80
Potatoes	196	...do	25,133	128.42	350	.75	18,850	96.17
Garden and miscellaneous	1,575						28,160	17.87
Hay (except above)	936	Ton	830	.89		5.50	4,570	4.88
Alfalfa (planted in 1915)	2,070	...do	400	.19		8.00	3,200	1.55
Pasture:								
Alfalfa							11,754	
All other	11,590						11,561	.99
Less duplications	888							
Total	38,495						592,523	
Per acre								15.39

The live-stock wealth of the project made a very satisfactory growth during 1915. The project inventory of live stock made by the United States Reclamation Service at the beginning and at the end of the year is summarized in Table VI, which is arranged so that a direct comparison of each class can be made.

TABLE VI.—*Live stock on the Truckee-Carson Reclamation Project in 1915.*

Item.	Inventory, Jan. 1.			Inventory, Dec. 31.			Increased total value.
	Number.	Value.	Total value.	Number.	Value.	Total value.	
Horses	3,079	$86.90	$267,575	3,210	$80.41	$258,143	−$9,432
Mules	404	86.40	34,905	570	92.56	52,760	17,855
Cattle:							
Dairy	1,503	84.50	127,190	2,433	82.84	201,550	74,360
Other	4,540	35.75	181,759	5,957	40.00	238,297	56,538
Sheep	1,981	5.20	10,214	4,710	4.98	23,460	13,246
Hogs	3,815	8.65	32,899	4,836	6.28	30,394	− 2,505
Fowls:							
Turkeys	6,972	2.30	15,988	12,000	2.41	28,920	12,932
Other	27,399	.60	16,759	22,912	.55	12,531	− 4,228
Bees, hives	1,621	4.40	7,104	2,500	4.05	10,125	3,021
Total			694,393			856,180	161,787

The market for alfalfa hay has been unsatisfactory, naturally bringing about this entrance into live-stock enterprises. The dairy industry especially has made great progress. The increase in the number of dairy cows in 12 months has been 62 per cent. The amount of butter fat sold to the local creamery was 279,656 pounds, for which $74,860.94 was paid, an average of 26.8 cents per pound. The average monthly cash income to the farmers of the project was therefore approximately $6,240.

DISTRIBUTION OF TREES AND SHRUBS.

Trees and shrubs were distributed in the spring of 1915 to 42 farmers and 4 schools, as follows: 114 Russian oleaster, 915 native tamarisk (mostly cuttings), 6 *Tamarix africana*, 10 *Tamarix indica*, 5 *Tamarix gallica*, 66 Chinese poplar, 116 black locust, 64 box elder, 36 Carolina poplar, 12 Volga poplar, 317 Norway poplar, 57 Chinese willow, 36 Golden willow, 2 weeping willow, 6 globular-headed willow, 55 apple seedlings, 4 plums, 22 white elm, 17 Karagatch elm, 8 pine trees, 30 Russian mulberry, 6 Chinese peach, 4 purple-leaved barberry, 7 honey locust, 2 silver-leaved poplar, and 1 climbing rose.

It is planned in the future to limit the distribution of trees and shrubs to schools, parks, or other public grounds. Farmers will still be permitted to make cuttings for propagation from such trees as are available on the experiment farm, but the nursery stock will not hereafter be grown for distribution to private individuals. The distribution of ornamental trees from the experiment farm during the last five years has been of value in increasing the number and variety of trees about the farm homes on the project, and such plantings have shown which varieties are best suited to local conditions.

ALFALFA.

The alfalfa crop on the experiment farm and over the project generally was greatly decreased by freezing weather, which occurred on April 30. In most sections of the project the freezing was not severe enough to kill the alfalfa back to the ground, but the injury to the young stems was such that growth was much retarded and the first crop was small. The yield of this cutting on the experiment farm averaged only 1,670 pounds per acre, as compared with 3,500 pounds the previous year. The second and third cuttings in 1915 were normal, but the total yield of the three cuttings on the experiment farm was only about 3 tons per acre, or 1 ton per acre less than in 1914. In normal years the first crop is the heaviest of the three cuttings, but in 1915 it was the lightest, the percentage of the entire crop in each cutting being 27, 40, and 33, respectively.

PASTURING HOGS ON ALFALFA.

In order to determine what returns could be secured from alfalfa by pasturing it with hogs, an experiment to that end was begun in May, 1915. One quarter of an acre of alfalfa was used; this plat was subdivided and the pigs were changed from one pasture to the other each week. Ten pigs were used in the experiment, five of them being grade Durocs and five grade Berkshires. They were of fair quality, but three of the lot did not do well. While on the pasture the pigs were fed daily a supplementary ration of rolled barley at the rate of 2 pounds of grain for each 100 pounds of live

weight. They also had access to a mixture of condiments, including slacked coal and salt.

The pasturing period extended from May 16 to September 18. During the early part of the season the pasture produced more feed than the pigs could consume, but later it was kept so short that after September 1 the growth of the pigs was retarded materially. The pigs were each weighed every week throughout the season. The results of this pasturing experiment are summarized in Table VII. In the summary the value assigned to the rolled barley is $30 per ton, and the value of the increase in live weight of the pigs is assumed to be 7 cents a pound. To permit easy comparison with other experiments, the results are computed on the basis of the acre unit, though only a quarter of an acre was actually used.

TABLE VII.—*Results of pasturing hogs on alfalfa with a 2 per cent ration of barley on the Truckee-Carson Experiment Farm, 1915.*

Hogs on alfalfa.	Pounds.	Hogs on alfalfa.	Value.
Initial weight per acre	1,560	Gain at 7 cents per pound	$133.84
Final weight per acre	3,472	Barley fed	89.80
Total gain per acre in 125 days	1,912	Net gain per acre	44.04
Grain fed for each pound of gain	3.1		

The summarized statement shows that the returns from alfalfa pastured by hogs were much larger than could have been expected from the same alfalfa made into hay. While it may not be practicable to utilize a very large proportion of the alfalfa crop of the project as hog pasture, it is possible to use alfalfa pasture for all the hogs that are produced and in so doing to secure much cheaper gains than can be expected from keeping the hogs in pens.

EXPERIMENTS WITH CORN.

Tests were made with field corn on the experiment farm, on the farm of Frank Oar, 6 miles west of Fallon, and on the farm of T. V. Conners, 9 miles south of Fallon. None of the yields were high, but they indicate that satisfactory results may be expected when varieties better adapted to this section are secured. The acclimatization of a suitable variety, together with careful selection of seed, will undoubtedly do much to increase the corn crop of the Truckee-Carson project. The seed of the varieties so far tested has all been brought from other States each year, so that a fair test with acclimatized seed has not yet been possible.

As the future agriculture of the project will include dairying and hog raising, corn will be almost an essential in making for the success of these enterprises, silage corn being used as a supplemental feed for dairy cows and ear corn to finish hogs for the best markets.

The scarcity and high price of suitable grain with which to finish the hogs have resulted in shipping to market large numbers of hogs not well finished.

A comparative test of 21 varieties of corn was made on the farm of T. V. Conners, of the Island District. The planting was done on May 29. The growing period was ended by a frost on September 14, after 108 days. Many varieties were not yet mature, as is shown by their high moisture content (Table VIII). The test would have been more satisfactory had the planting been made before May 15, but circumstances were such that this could not be done.

The varieties listed in Table VIII are arranged in the order of their apparent suitability, as shown by the 1915 test. The percentage of moisture was determined by weighing 20 ears as soon as husked and again four weeks later. The loss in moisture gives a fair idea of the relative maturity of the varieties. The shelling percentage was determined by weighing and shelling 6 to 10 of the dried ears.

TABLE VIII.—*Results of a corn-variety test on the farm of T. V. Conners, Fallon, Nev., 1915.*

No.	Variety.	Source of seed.	Loss of moisture.	Shelling percentage.	Height of stalk.	Yield shelled, per acre.	
						Pounds.	Bushels.
			Per ct.		*Feet.*		
1	Triumph Flint	Northrup, King & Co	35	73	6	2,950	52.7
2	Australian White Flint	Cereal Investigations	28	67	8	2,772	49.5
3	Riverview Special	Dakota Improved Seed Co.	24	72	7¾	1,990	35.5
4	Disco Pride	do	15	79	5¾	1,918	34.3
5	U. S. Selection 133	Cereal Investigations	30	73	8	1,813	32.4
6	Minnesota No. 13	Dakota Improved Seed Co.	24	72	7¾	1,598	28.6
7	Minnesota No. 23	do	14	74	6	1,492	26.7
8	Martens White Dent	Cereal Investigations	38	71	7½	1,670	29.8
9	Northwestern Dent	Dakota Improved Seed Co.	28	71	7	1,777	31.7
10	Wimples Yellow Dent	Cereal Investigations	46	74	8½	1,706	30.5
11	Smoky Dent	Northrup, King & Co	35	72	7	1,670	29.8
12	Disco Eighty-Five-Day	Dakota Improved Seed Co.	25	72	5	1,670	29.8
13	Rustler White Dent	Northrup, King & Co	41	71	7¼	1,598	28.5
14	Disco Ninety-Day	Dakota Improved Seed Co.	38	71	7	1,563	27.9
15	Bloody Butcher No. 160	Cereal Investigations	37	65	8¼	1,563	27.9
16	Gold Medal	Northrup, King & Co	40	76	7½	1,386	24.8
17	U. S. Selection 160	Cereal Investigations	35	65	8¼	1,208	21.6
18	Gold Mine	Northrup, King & Co	35	78	8½	1,137	20.3
19	Silver Mine	do	45		8½		
20	Hickory King	Bartelds Seed Co	No ears.				
21	Brazilian Stooling flour corn.	do	do				

In 1915 two flint varieties, the Triumph and Australian White, produced the highest yields, while in 1914 the best flint variety was outyielded by 11 dent varieties. Another peculiar result obtained was that three of the varieties which gave the best yields in 1914—Disco Ninety-Day, Northwestern Dent, and Gold Medal—were near the bottom of the list in the 1915 test.

A field of Disco Ninety-Day White Dent was planted on May 17 on the farm of Frank Oar. The rows were 3 feet apart and the hills

about 3 feet apart in the row. The total area of the field was 1.375 acres. An estimate of the total yield of the field was made by weighing the product from four rows, which was found to be 67.5 pounds per row. The estimated yield of the entire field containing 47 rows was 3,170 pounds, or 2,305 pounds (32.9 bushels) per acre. The corn was well matured.

WHEAT.

Eight varieties of wheat were tested comparatively on the farm of A. R. Merritt. They were seeded in duplicate plats April 11, 1915. Seed of the Sonora, Rieti, Ghirka, Dicklow, Bluestem, and Little Club varieties were received from the Office of Cereal Investigations of the Bureau of Plant Industry, and seed of the Marquis and Defiance wheats was received from the Nevada agricultural experiment station.

The soil on which this wheat was grown was a black, sandy loam, and the rate of seeding was 75 pounds per acre. The Little Club proved to be the best yielding variety in both 1914 and 1915, and the Dicklow has come out each year second best. The Rieti is a high-yielding variety, but is not likely to prove popular with farmers because of its strong awns. The Ghirka was the lowest yielding variety, but better results might have been obtained if it had been harvested a few days earlier. It was overripe at the time of cutting and shattered badly. A detailed statement of the results is given in Table IX.

TABLE IX.— *Yields of wheat varieties tested on the farm of A. R. Merritt, near Fallon, Nev., 1915.*

Variety.	Series I.		Series II.		Average yield per acre.	
	Acre.	Yield per acre.	Acre.	Yield per acre.	Pounds.	Bushels.
		Pounds.		*Pounds.*		
Little Club	0.45	2,555	0.56	2,871	2,731	45.5
Dicklow	.45	2,316	.22	2,864	2,496	41.6
Rieti	.45	2,460	.33	2,697	2,560	42.7
Bluestem	.45	2,333	.45	2,531	2,431	40.5
Marquis	.67	2,234	.45	2,493	2,339	39.0
Defiance	.67	2,312	.....	.....	2,312	38.5
Sonora	.45	2,036	.33	2,524	2,242	37.3
Ghirka	.45	2,102	.22	2,091	2,099	35.0

BARLEY.

A variety test, including five varieties of barley, was made in the Island District on the farm of H. E. Smith. Seed of the Coast (California Feed), Hannchen, Svanhals, and Hull-less varieties was received from the Office of Cereal Investigations of the Bureau of Plant Industry. Seed of the variety called Kents was purchased locally.

The Coast proved to be by far the best variety of those tested. The Hannchen, although second in yield per acre, was undesirable because of its short growth, the straw being so short that it was difficult to bind it into bundles.

The test was made on duplicate plats in a soil that was not very uniform. Table X shows the results obtained with each variety.

TABLE X.—*Results of a test of varieties of barley on the farm of H. E. Smith, near Fallon, Nev., 1915.*

Variety.	Plat area.	Yield per acre.	
		Pounds.	Bushels.
Coast	0.9	2,040	42.5
Hannchen	.9	1,581	33.0
Svanhals	1.12	1,435	29.9
Kents	.9	1,435	29.9
Hull-less	.45	1,218	25.4

MANGELS.

An experiment with two varieties of mangels was conducted on the farm of C. H. Hancock. The field contained 2 acres. About one-fifth of it was heavily manured previous to planting, and the remainder was left unfertilized. About half of the field was planted to Golden Tankard, the remainder with red mangels. The date of seeding was April 21.

As no wagon scales were available at harvest time, only 10 rows were weighed to determine the approximate yield. Two rows of Golden Tankard on manured land yielded 500 and 535 pounds each, indicating a yield of 27½ tons per acre.

Four rows of Golden Tankard beets on unmanured land yielded 346, 321, 320, and 304 pounds, respectively, or an average yield per acre of 17.2 tons.

Four rows of long red mangels on unmanured land weighed 274, 335, 282, and 136 pounds, respectively, or an average yield per acre of 13.7 tons.

These results indicate that the Golden Tankard varieties give larger yields in this section than the long red mangel, and that barnyard manure is very valuable when applied to soil on which mangels are to be grown.

VARIETY TEST OF TOMATOES.

Eighteen varieties of tomatoes were grown on the experiment farm in 1915. The seed was sown in the greenhouse March 5, transplanted to a distance of 4 inches apart in the greenhouse beds when of sufficient size, and set out in the field on May 22.

The varieties were planted in duplicate in plats designated A and B, and yields were obtained separately from each plat. A killing frost occurred on September 14 when the fruit had just begun to ripen rapidly. Had the vines been protected with muslin or other cover it is probable that the yield would have been more than doubled, as the next killing frost did not occur until October 3. The Perfection, which was the highest yielding variety in 1914, was also the best variety in 1915. As a rule, the earliest varieties have given the highest yields, because the growing season has been too short to permit the full production of the later varieties.

During the past three years the average yield of ripe tomatoes for the five best yielding varieties has been 4.6 pounds per plant. The date of first ripening and the yields of the tomato varieties are summarized in Table XI.

TABLE XI.—*Ripening dates and yields of varieties of tomatoes grown on the Truckee-Carson Experiment Farm, 1915.*

Variety.	Date of first picking.	Total number of plants.	Yield (pounds).	
			Total.	Average per plant.
Perfection	Aug. 16	59	223	3.8
Earliana	...do	66	173	2.6
Acme	...do	58	147	2.5
Favorite	Aug. 25	57	105	1.8
Yellow Pear	Aug. 16	47	85	1.8
Beauty	...do	65	105	1.6
Hummer	Aug. 27	57	86	1.5
Globe	Aug. 20	54	77	1.4
Stone	Aug. 26	56	80	1.4
Dwarf Champion	Aug. 16	61	71	1.2
Paragon	Aug. 23	55	63	1.1
Golden Queen	...do	62	58	.8
Purple Peach	Aug. 16	67	52	.9
Ponderosa	Aug. 30	63	45	.7
Coreless	Sept. 7	55	36	.7
Buckeye State	Aug. 7	58	27	.5
Honor Bright	Aug. 15	59	20	.3
Dwarf Stone	Aug. 26	60	14	.2

EXPERIMENTS WITH ONIONS.

Four varieties of onions were planted for a comparative test on March 30 on the farm of George Burton. These varieties were the Ohio Yellow Globe, Mammoth Yellow Prizetaker, Large Red Wethersfield, and a Yellow Globe from seed grown by Mr. Burton and described in the test as Burton Yellow Globe. The last-named variety was sown in duplicate with 10 rows in each plat. The other varieties were seeded in single plats of 16 rows each. The Yellow Globe varieties outyielded the Prizetaker and Red Wethersfield, indicating that the variety already commonly grown on the project is the best for general planting. A detailed statement of the results is shown in Table XII.

TABLE XII.— *Yield of onion varieties grown on the farm of George Burton, Fallon, Nev., in 1915.*

Variety.	Area.	Number of rows.	Yield.	Yield per acre.
	Acres.		*Pounds.*	*Pounds.*
Burton Yellow Globe	0.0535	20	1,462	27,450
Ohio Yellow Globe	.0423	16	1,176.5	27,770
Prizetaker	.0423	16	1,057	24,950
Red Wethersfield	.0428	16	8,375	19,530

FERTILIZER TEST WITH ONIONS.

A fertilizer test was conducted on Mr. Burton's farm, in addition to the variety test with onions. Ten rows of Yellow Globe onions were planted in each plat, as shown in Table XIII. The fertilizers tried were potassium sulphate, calcium acid phosphate, and ammonium sulphate, together with a mixture of the three fertilizers to form a complete fertilizer. The fertilizer was applied with a garden fertilizer drill which distributes it on each side of the rows of seeds. No attempt was made to determine the quantity applied per acre, the purpose of this experiment being merely to find if any marked stimulation might be expected from the use of any of these fertilizers. From the results obtained it would appear that nitrogen and phosphorus proved beneficial to the growth of the onions. The results of this experiment are shown in Table XIII.

TABLE XIII.—*Results of fertilizer test with onions, made on the farm of George Burton, Fallon, Nev., in 1915.*

Fertilizer.	Area.	Yield.	Yield per acre.
	Acres.	*Pounds.*	*Pounds.*
Check	0.0271	786	29,000
Potassium sulphate	.0271	905	33,380
Ammonium sulphate	.0274	1,029	37,520
Acid phosphate	.0274	1,131	41,300
Complete fertilizer	.0274	1,325	48,350
Check	.0278	889	32,050

THE EXPERIMENT-FARM DRAINAGE SYSTEM.

The tile-drainage system in the southern and eastern parts of the experiment farm drains an area of about 25 acres of cultivated land. In 1913 and 1914 and until May, 1915, the drainage water flowed into a reservoir from which it was pumped into the drainage system of the project. In May, 1915, the tile-drainage system was connected directly so as to discharge by gravity into the new, deep, open drain constructed by the United States Reclamation Service along the south side of the experiment farm (fig. 1). A weir was installed at the mouth of the drain, and weekly measurements were made of the flow of water. Water samples, taken at the time the discharge

measurements were made, were analyzed, in order to estimate the total amount of salts removed from the farm.

The total quantity of salts carried out through the tile drains in 1915 was estimated to be very much less than in 1914, possibly due to the influence of the Reclamation Service drain. The total amount of soluble salts removed during each month of the year for three years is shown in Table XIV.

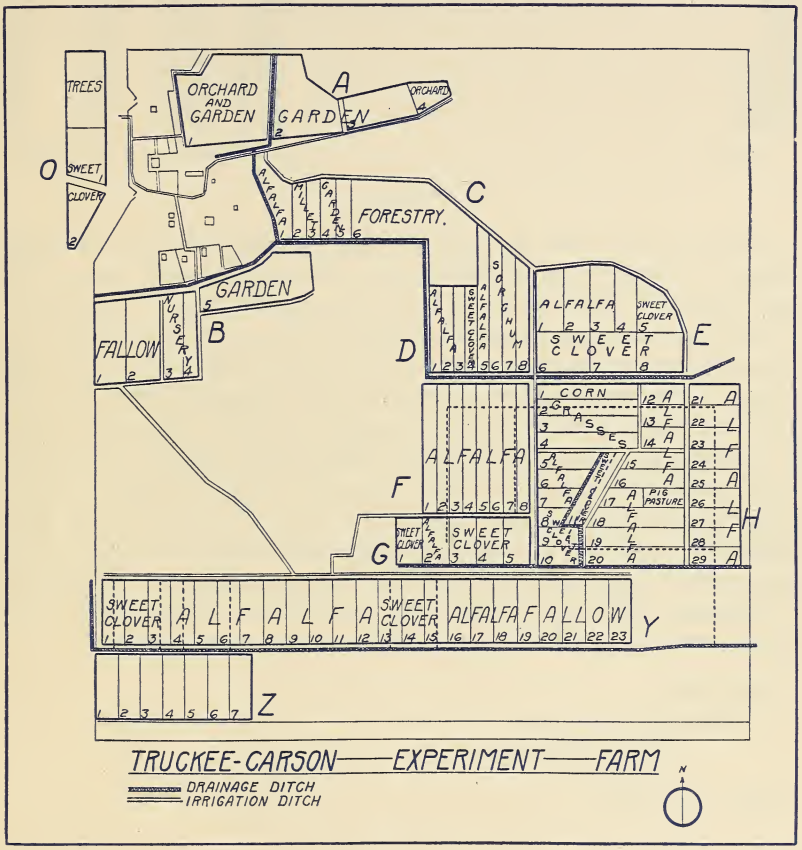

FIG. 1.—Diagram of the Truckee-Carson Experiment Farm, showing the arrangement of the fields used for the experiments in 1915.

It will be noted that Table XIV shows that the largest amount of salt is removed during the irrigation season. The use of irrigation water raises the water table, giving rise to a much larger flow of water from the drainage system and a consequent increase in the quantity of salt carried off.

TABLE XIV.—*Amount of soluble salts removed by the tile-drainage system on the Truckee-Carson Experiment Farm in 1913, 1914, and 1915.*

Month.	Salts removed (pounds).			
	1913	1914	1915	Average.
January	3,361	5,598	9,618	6,192
February	4,641	8,187	9,006	7,278
March	10,397	18,966	8,810	12,724
April	21,286	21,747	10,514	17,849
May	30,155	23,025	8,187	20,456
June	14,591	15,811	10,000	[a] 13,467
July	7,010	33,263	10,000	[a] 16,758
August	4,099	39,716	11,834	18,550
September	4,672	17,577	2,645	8,298
October	4,011	13,544	2,482	6,679
November	3,352	16,963	4,164	8,160
December	3,903	13,856	988	6,269
Total	111,538	228,253	88,248	142,680

[a] Estimated.

A total of 214 tons of alkali has been removed by this drainage system in three years, approximately 8.5 tons for each acre of the area drained. The amount of salt in the upper 3 feet of this portion of the farm amounts to approximately 9 tons per acre, or about the same amount as has been removed in three years by the drainage system. The soil of the area served by the drainage system does not show any appreciable reduction of its salt content in the upper 3 feet. It would appear, therefore, that the tile-drainage system draws alkali water either from sources deeper than the surface 3 feet of soil or from an area much larger than the actual extent of the system. Beneficial results, as indicated by the improvement of crops, do not seem to have been obtained as yet from the installation of this system of drainage, although it may have prevented a general rise of the ground water that would have been of serious consequence.

Approved:

WM. A. TAYLOR,
Chief of Bureau.

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